

LANDBIRD INVENTORY FOR LEWIS AND CLARK NATIONAL HISTORICAL PARK (2004)

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Summary

In 2004 The Institute for Bird Populations (IBP) collaborated with personnel at Lewis and Clark National Historical Park to initiate a Park-wide inventory of landbirds. The goals of the inventory were to estimate habitat-specific density and park-wide abundance for a large suite of species, and to produce information that will assist park managers and cooperators in designing the park's long-term landbird monitoring program.

During late May 2004, we counted 494 individual birds during 35 point counts conducted in the Park. We documented 61 bird species (including the Hermit-Townsend's Warbler hybrid) in the park during the brief field season. Fifty-eight of these were detected during at least one point count, while the remaining three were recorded only at times other than during point counts. We also categorized the habitat and collected location-specific variables at each of the 35 survey points. Although the original sample design included a Park-wide grid comprised of 101 point count locations, we learned at the last minute that park personnel were unable to arrange permission for us to access lands that were in the process of being transferred to park management. Unfortunately, these lands constitute the majority of the Park. We were thus unable to access 66 out of 101 sampling points.

Acknowledgments

We thank S. Stonum for his hospitality and logistical assistance while our crew worked in the Park and R. Kuntz at North Cascades National Park Service Complex for playing a key role in bringing this project to fruition. The North Coast Cascades Network Bird Sampling Group was involved in structuring the sample design for this project. We are especially grateful for the hard work and dedication of our field crews: A. Brown (crew leader), Mandy Holmgren, Roberto Quintero, and Katie Stassen. B. Rolph assisted with the administration of our NPS contract. We thank David F. DeSante for reviewing a draft of this report. This is Contribution No. 264 of The Institute for Bird Populations.

Introduction

Reported declines of many birds breeding in North America have stimulated interest in avian population trends and mechanisms driving those trends (DeSante and George 1994). The North American Breeding Bird Survey suggests that landbird populations in Pacific Northwest late-seral forests appear to be in serious decline (Sauer et al. 2003), and data from the national parks are particularly important for teasing out possible causes. Quantitative survey data for bird habitat usage and abundance at Lewis and Clark National Historical Park are currently lacking. Existing presence/absence data are insufficient for tracking population changes over time, or for gauging the effects of any future management actions that may alter habitat conditions. These goals require species-specific density estimates.

In September 2000, personnel from throughout the North Coast/Cascades Network met with landbird monitoring experts to produce recommendations for a long-term monitoring plan for landbirds (Siegel and Kuntz II, 2000). The panel recommended that each of the major parks in the network begin by initiating an inventory to elucidate spatial patterns of abundance for a large suite of species. Because birds are well-suited to serve as indicators of ecological change (Furness et al. 1993), these inventories could then serve as baselines for monitoring future ecological changes within the park, assessing the affects of future management actions on bird populations, and formulating efficient long-term bird monitoring strategies.

We designed this inventory project to determine habitat-specific density of landbirds during the breeding season at Lewis and Clark National Historical Park, using methods consistent with those employed in other parks across the North Coast/Cascades Network (Siegel et al 2002; Siegel et al. 2004a; Siegel et al. 2004b; Wilkerson et al. 2005).

Methods

Survey Design

We used existing geographic information system (GIS) data to select a random starting point, and then overlay a systematic grid of survey points, 250 m apart, across the park's land holdings.

Although we designed this project strictly to inventory landbirds, we amassed numerous waterbird detections during our time spent on Lewis and Clark National Historical Park land holdings. These observations should be considered anecdotal, rather than systematically produced.

Crew Training and Testing

At the beginning of the field season we provided our field crew, who were to spend most of the field season conducting surveys at Mount Rainier National Park, with an intensive two-week training program at Olympic and North Cascades National Parks. We trained our crew members, who generally had prior experience birding and conducting biological fieldwork, in visual and aural bird identification, distance estimation, plant identification, orienteering, backcountry safety, and project protocols. Crew members honed their bird identification skills by spending days in the field birding and practicing point counts with experienced trainers, and then reviewing at night with the aid of field guides, taped songs and calls, and an instructional CD-ROM. At the end of the two-week training period, we gave all crew members a rigorous exam involving the identification of approximately 100 taped songs and calls (some of them grouped together in rapid succession to produce 'simulated point counts') as well as 30-40 photographic images (generally of rarer species or less obvious female plumages). Crew members were not permitted to conduct point counts until they passed the exam, which was altered for each administration. Passing the exam, which required a near-perfect score, ensured that observers could competently identify by sight and sound all species expected to occur in the park. Upon arriving at Lewis and Clark National Memorial our field crew spent an afternoon and morning familiarizing themselves with the area as well as the local dialects of the resident birds, of which only the Hermit Warbler was not present at the aforementioned training locations.

Field Methods

Conducting Point Counts. We conducted all fieldwork between May 28 and May 30 of 2004. Prior to leaving for the field, crews were provided with coordinates and maps of intended sample points for the morning. Observers sampled points from the predefined sample grid. Observers used standardized pacing, and navigated using a map, compass, and GPS unit to find successive points in the grid.

We used five-minute variable circular plot (VCP) point counts (Fancy and Sauer 2000, Siegel 2000) coupled with detailed habitat descriptions of each point count location as our primary means of surveying birds. VCP point counts entailed recording the horizontal distance, estimated to the nearest meter, to every bird seen or heard during the point count.

Each morning in the field, each person sampled approximately 5-6 points from the predefined sample grid. Point count observers flagged the trail from point to point as the transect was conducted in order to return to each of the points later in the morning to collect vegetation data at each of the points.

Point counts began within ten minutes of local sunrise, and continued until 3.5 hours after local sunrise. 'Flyovers'—defined as birds that flew over the top of the vegetation canopy, never touched down in the observer's field of view, and did not appear to be foraging, displaying, or behaving in any other way that

might suggest a link to the habitat below—were tallied separately from other bird detections. Birds thought to have been recorded previously at another point were marked accordingly on the data forms. Geographical coordinates based on GPS readings and topographic maps were recorded at each sampling point. We recorded whether each bird was initially detected during the first three minutes or last two minutes of the point count, in order to improve comparability with data from the Breeding Bird Survey (BBS) which utilizes three-minute counts. We also recorded whether each bird was initially detected visually or aurally, and whether the bird sang at any time during the count.

Additionally, whenever crew members detected species thought to be rare or difficult to sample in the park, they completed “Rare Bird Report Forms”, including descriptions of the birds’ appearance and behavior and geographical coordinates. These reports covered not only birds detected during point counts, but also birds detected while sampling vegetation, hiking between points, or at any other time within the survey dates our crew was present at the park. Although our project focused explicitly on diurnal passerine and near-passerine birds, we frequently used these rare bird report forms to record owls, raptors, and other species which were poorly sampled by our point count protocol, regardless of their actual rarity.

All Universal Transverse Mercator (UTM) coordinates presented in this report are based on NAD83, Zone 10.

Classifying Habitat at Bird Survey Points. Vegetation descriptions at each point entailed assigning a primary habitat classification to a circular 50 m radius plot centered on the point count station. Vegetation plots occasionally straddled more than one distinct habitat type; in these cases observers classified the point as being dominated by the habitat that covered the larger portion of the plot, and then additionally recorded the ‘secondary’ habitat present in the plot. Observers recorded canopy closure using a spherical densiometer and taking readings facing the four cardinal directions from the center of each vegetation plot. Other point specific data collected included a ground moisture score, running and standing water scores, and recording the presence of other habitats beyond the 50 m circle that may have influenced the local bird community.

Results

Bird Species Detected in the Park

All bird species detected during the 2004 field season, including 61 species detected during point counts and 3 additional species detected only at times other than during point counts, are listed in Table 1.

General Survey Results

We recorded 494 individual bird detections during 35 point counts in 13 distinct habitat types. Point count totals for each habitat are listed in Table 2 and the UTM locations (based on NAD83) of all 35 point counts are listed in Table 3. Only a single habitat, Willow/Shrub Wetland, accumulated more than five sample points; the remaining 12 habitats were each sampled with four points or fewer.

Discussion

Limitations of Our Dataset

The small land mass comprised by Lewis and Clark National Historical Park limited the number of points we could survey, and consequently, our sample sizes. In fact, the extremely low sample sizes prevented any meaningful analysis to be completed on the data. Although the original sample design included a Park-

wide grid comprised of 101 point count locations, we learned at the last minute that park personnel were unable to arrange permission for us to access lands that were in the process of being transferred to park management. Unfortunately, these lands constitute the majority of the Park. We were thus unable to access 66 out of 101 sampling points. The addition of those 66 points to the current data set would have yielded a far more robust data set, and enabled us to better elucidate species-habitat relationships and densities for a large suite of species in the Park.

The raw point count data accompany this report. If it becomes desirable to resurvey the park again in the future, the data analyst may wish to pool our results with future results when fitting detection functions, thereby increasing the sample sizes.

Conservation Issues

Seventeen individual Brown-headed Cowbirds were detected on 13 (of 35) point counts. Brown-headed Cowbirds are obligate nest parasites and have been implicated in the local decline of MacGillivray's Warbler on San Juan Island National Historical Park (Lewis and Sharpe 1987). Brown-headed Cowbirds are well known for impacting populations of several songbird species; particularly species of Flycatchers, Vireos, and Warblers, many of which nest within Lewis and Clark National Historical Park. The small size of the park coupled with the adjacent land use practices make Brown-headed Cowbirds an important concern for songbird species in Lewis and Clark National Historical Park that are susceptible to nest parasitism.

Future Considerations

A network-wide landbird monitoring plan (Siegel et al. 2005) is currently under development. In the event that this plan is implemented the 250-m resolution, park-wide grid used for this inventory may serve as the monitoring sample design in Lewis and Clark National Historical Park.

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Wilkerson, R. L., R. B. Siegel, and J. Schaberl. 2005. Landbird inventory for Mount Rainier National Park: first annual progress report. The Institute for Bird Populations, Point Reyes Station, CA.

Table 1. All species detected in the Lewis and Clark National Historical Monument during our 2004 field season. Asterisks indicate species that were detected only at times other than during point counts.

1. Double-crested Cormorant	32. Winter Wren
2. Great Blue Heron	33. Marsh Wren
3. Turkey Vulture*	34. Golden-crowned Kinglet
4. Canada Goose	35. Swainson's Thrush
5. Mallard	36. American Robin
6. Osprey	37. European Starling
7. Bald Eagle	38. Cedar Waxwing
8. Northern Harrier*	39. Orange-crowned Warbler
9. Killdeer	40. Yellow Warbler
10. Spotted Sandpiper	41. Yellow-rumped Warbler
11. Western Gull	42. Black-throated Gray Warbler
12. Caspian Tern	43. Townsend's Warbler
13. Band-tailed Pigeon*	44. Townsend's x Hermit Warbler Hybrid
14. Mourning Dove	45. Hermit Warbler
15. Rufous Hummingbird	46. Common Yellowthroat
16. Hairy Woodpecker	47. Wilson's Warbler
17. Pileated Woodpecker	48. Western Tanager
18. Willow Flycatcher	49. Spotted Towhee
19. Pacific-slope Flycatcher	50. Savannah Sparrow
20. Hutton's Vireo	51. Song Sparrow
21. Warbling Vireo	52. White-crowned Sparrow
22. Steller's Jay	53. Dark-eyed Junco
23. American Crow	54. Black-headed Grosbeak
24. Common Raven	55. Red-winged Blackbird
25. Violet-green Swallow	56. Brewer's Blackbird
26. Cliff Swallow	57. Brown-headed Cowbird
27. Barn Swallow	58. Purple Finch
28. Black-capped Chickadee	59. Red Crossbill
29. Chestnut-backed Chickadee	60. Pine Siskin
30. Red-breasted Nuthatch	61. American Goldfinch
31. Brown Creeper	

Table 2. Number of points conducted in each habitat at Lewis and Clark National Historical Park.

Habitat Name	Points
Willow/Shrub Wetland	7
Riverine Wetland	4
Shore Pine	4
Shrub	4
Dune Grass	3
Western Hemlock	3
Meadow	2
Palustrine Wetland	2
Red Alder	2
Conifer Deciduous Mix	1
Douglas-fir	1
Pasture	1
Water	1
Total	35

Table 3. Point count locations and field-based habitat classifications for each survey point. Northings and eastings are zone 10 UTM coordinates based on NAD83. Note that points are not numbered sequentially from 1, as we were unable to access the majority of our intended sampling points. See discussion for details.

Point	Northing	Easting	Primary Habitat	Secondary Habitat
59	5109545	431783	Western Hemlock	
60	5109290	431764	Western Hemlock	
66	5109547	432012	Conifer Deciduous Mix	Western Hemlock
67	5109291	431999	Douglas-fir	
68	5109071	432018	Meadow	
69	5108832	432034	Palustrine Wetland	
72	5109793	432267	Western Hemlock	
73	5109541	432271	Riverine Wetland	Willow/Shrub Wetland
74	5109095	432254	Water	Riverine Wetland
75	5108903	432347	Willow/Shrub Wetland	Riverine Wetland
76	5108292	432261	Red Alder	Water
77	5108043	432267	Willow/Shrub Wetland	Water
78	5107793	432281	Red Alder	Water
80	5109314	432522	Shrub	Meadow
81	5109533	432529	Riverine Wetland	Water
82	5107781	432504	Willow/Shrub Wetland	
83	5107543	432522	Shrub	Willow/Shrub Wetland
84	5107378	432495	Willow/Shrub Wetland	Water
85	5109898	432781	Riverine Wetland	Pasture
86	5107424	432772	Meadow	Riverine Wetland
87	5107489	433022	Pasture	Water
88	5107523	433282	Willow/Shrub Wetland	Water
89	5107479	433522	Willow/Shrub Wetland	Water
99	5107543	432266	Riverine Wetland	Willow/Shrub Wetland
100	5105849	427138	Dune Grass	
101	5105850	427390	Shore Pine	
102	5105597	427389	Dune Grass	Shore Pine
103	5105340	427380	Dune Grass	
104	5106350	427658	Palustrine Wetland	Red Alder
105	5106050	427635	Willow/Shrub Wetland	Shore Pine
106	5105840	427648	Shore Pine	Willow/Shrub Wetland
107	5105600	427635	Shore Pine	Willow/Shrub Wetland
108	5105359	427648	Shore Pine	Palustrine Wetland
109	5106349	427899	Shrub	Shore Pine
110	5106106	427891	Shrub	Conifer Deciduous Mix

Appendix A: Scientific Names of All Bird Species Listed in this Report

Common Name	Scientific Name ¹
Canada Goose	<i>Branta canadensis</i>
Mallard	<i>Anas platyrhynchos</i>
Double-crested Cormorant	<i>Phalacrocorax auritus</i>
Great Blue Heron	<i>Ardea herodias</i>
Turkey Vulture	<i>Cathartes aura</i>
Osprey	<i>Pandion haliaetus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Northern Harrier	<i>Circus cyaneus</i>
Killdeer	<i>Charadrius vociferus</i>
Spotted Sandpiper	<i>Actitis macularius</i>
Western Gull	<i>Larus occidentalis</i>
Caspian Tern	<i>Sterna caspia</i>
Band-tailed Pigeon	<i>Patagioenas fasciata</i>
Mourning Dove	<i>Zenaida macroura</i>
Rufous Hummingbird	<i>Selasphorus rufus</i>
Hairy Woodpecker	<i>Picoides villosus</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>
Willow Flycatcher	<i>Empidonax alnorum</i>
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>
Hutton's Vireo	<i>Vireo huttoni</i>
Warbling Vireo	<i>Vireo gilvus</i>
Steller's Jay	<i>Cyanocitta stelleri</i>
American Crow	<i>Corvus brachyrhynchos</i>
Common Raven	<i>Corvus corax</i>
Violet-green Swallow	<i>Tachycineta thalassina</i>
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>
Barn Swallow	<i>Hirundo rustica</i>
Black-capped Chickadee	<i>Poecile atricapillus</i>
Chestnut-backed Chickadee	<i>Poecile rufescens</i>
Red-breasted Nuthatch	<i>Sitta canadensis</i>
Brown Creeper	<i>Certhia americana</i>
Winter Wren	<i>Troglodytes troglodytes</i>
Marsh Wren	<i>Cistothorus palustris</i>
Golden-crowned Kinglet	<i>Regulus satrapa</i>
Swainson's Thrush	<i>Catharus ustulatus</i>
American Robin	<i>Turdus migratorius</i>
European Starling	<i>Sturnus vulgaris</i>
Cedar Waxwing	<i>Bombycilla cedrorum</i>
Orange-crowned Warbler	<i>Vermivora celata</i>
Yellow Warbler	<i>Dendroica petechia</i>
Yellow-rumped Warbler	<i>Dendroica coronata</i>
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>
Townsend's Warbler	<i>Dendroica townsendi</i>
Townsend's x Hermit Warbler Hybrid	<i>Dendroica townsendi x occi.</i>
Hermit Warbler	<i>Dendroica occidentalis</i>

Appendix A, continued

Common Name	Scientific Name
Common Yellowthroat	<i>Geothlypis trichas</i>
Wilson's Warbler	<i>Wilsonia pusilla</i>
Western Tanager	<i>Piranga ludoviciana</i>
Spotted Towhee	<i>Pipilo maculatus</i>
Savannah Sparrow	<i>Passerculus sandwichensis</i>
Song Sparrow	<i>Melospiza melodia</i>
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>
Dark-eyed Junco	<i>Junco hyemalis</i>
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>
Red-winged Blackbird	<i>Agelaius phoeniceus</i>
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>
Brown-headed Cowbird	<i>Molothrus ater</i>
Purple Finch	<i>Carpodacus purpureus</i>
Red Crossbill	<i>Loxia curvirostra</i>
Pine Siskin	<i>Carduelis pinus</i>
American Goldfinch	<i>Carduelis tristis</i>

¹Names follow American Ornithologists' Union Checklist of North American Birds (1998).

Appendix B: Metadata for the Avian Inventory of Lewis and Clark National Historical Park

The accompanying CD contains the MS Access file IBP_LECL_DATA containing three tables: ibp_pct, ibp_veg, and ibp_rare. This appendix serves as metadata for these files. Note that tables referred to in the field descriptions below are presented at the end of the appendix.

1. POINT COUNT DATA: IBP_PCT

This file contains all point count data from the 2004 field season.

Field: LOC

Description: Identifies the park, LECL = Lewis and Clark National Historical Park.

Field: DATE

Description: The date the point count was conducted (mm/dd/yyyy).

Field: POINT

Description: Identifies the point number. **This field may be used to link data between the point count and veg files.**

Field: HAB

Description: Signifies the bird classification habitat type. See Table B1 for a list of habitats and their codes.

Field: BIRDOBS

Description: Initials of the point count observer. See Table B3 for full list of observer names.

Field: NOISE

Description: Noise interference, scored from 1 to 5, where 1 = no noise, 2=*gentle babbling brook noise*, probably not missing birds; 3=*babbling creek noise*, might be missing some high-pitched songs/calls of distant birds; 4=*rushing creek noise*, detection radius is probably substantially reduced; 5=*roaring creek/river noise*, probably detecting only the closest/loudest birds.

Field: TIME

Description: 4-character field indicating the time of day the point count began.

Field: SPEC

Description: 4-character bird species code. See Table B2 for bird species codes.

Field: COMMONNAME

Description: Common name of species coded in SPEC field.

Field: DIST

Description: Horizontal distance in meters to a bird when it was first detected.

Field: PREV

Description: An 'X' indicates that the same individual was recorded on at least two consecutive points counts. The record with the 'X' indicates the point at which the detected individual was at a greater distance from the observer.

Field: FLY

Description: Indicates the number of birds detected as flyovers.

Field: SEENFIRST

Description: 'Y' indicates the distance to the bird was estimated *after* visually locating the bird. 'N' indicates the distance to the bird was estimated without the use of visual cues.

Field: EVERSANG

Description: 'Y' indicates the bird sang at least once during the five-minute point count. 'N' indicates the bird did not sing during the five-minute point count.

Field: Interval

Description: '3' indicates the bird was first detected in the first three minutes of the five-minute point count period. '2' indicates the bird was first detected in the last two minutes of the five-minute point count period.

Field: Flock

Description: Indicates multiple birds in a flock. A blank field indicates a single individual.

2. Habitat Data I: ibp veg

This file contains habitat data from each of the point count stations visited during the 2004 field season.

Field: POINT

Description: Identifies the point number.

This field may be used to link data in each of the databases on this disk.

Field: HAB

Description: 4-character code identifying the dominant habitat type within a 50 m radius of the survey point. See Table B1 for list of habitat codes and corresponding habitat names.

Field: HAB2

Description: 4-character code identifying a secondary habitat type (if present) within a 50 m radius of the survey point. See Table B1 for list of habitat codes and corresponding habitat names.

Field: DATE

Description: The date the vegetation was sampled (mm/dd/yyyy).

Field: BIRDOBS

Description: Initials of the point count observer. See Table A4 for full list of observer names.

Field: VEGOBS

Description: Initials of the vegetation observer. See Table A4 for full list of observer names.

Field: NORTHING

Description: UTM northing (NAD83) of the survey point.

Field: EASTING

Description: UTM easting (NAD83) of the survey point.

Field: GPSError

Description: Error in meters of GPS reading, as provided by hand-held GPS unit.

Field: Moist

Description: Soil moisture in the 50 m radius circle. 1=dry, 2=moist, 3=wet.

Field: STANDH20

Description: Area (square meters) of the 50 m radius circle covered in standing water.

Field: RUNH20

Description: Index describing running water in the 50 m radius circle. 1=none, 2=trickle, 3=small stream, 4=large stream, 5=river.

Field: OTHERHAB1

Description: 4-character code indicating the presence of other habitat types outside of the 50 m radius circle but within 100 m of the center of the veg plot. See Table B1 for list of habitat codes and corresponding habitat names.

Field: OTHERHAB2

Description: 4-character code entered indicating the presence of other habitat types outside of the 50 m radius circle but within 100 m of the center of the veg plot. See Table B1 for list of habitat codes and corresponding habitat names.

Field: NOTES

Description: General notes concerning the vegetation plot recorded by the observer recorded in the field.

Field: DENS_N

Description: Number of open vertices (out of 96 possible) on the spherical densiometer face, when the observer was facing north.

Field: DENSE

Description: Number of open vertices (out of 96 possible) on the spherical densiometer face, when the observer was facing east.

Field: DENSS

Description: Number of open vertices (out of 96 possible) on the spherical densiometer face, when the observer was facing south.

Field: DENSW

Description: Number of open vertices (out of 96 possible) on the spherical densiometer face, when the observer was facing west.

3. Rare Bird Data: ibp_rare

This file contains documentation of notable, unexpected, or otherwise poorly documented species that our crews detected in the park at times other than during point counts.

Field: SPEC

Description: 4-character bird species code. See Table B2 for key to bird species codes.

Field: COMMONNAME

Description: Common name of species coded in SPEC field.

Field: OBSERVER

Description: Initials of the rare bird observer. See Table B3 for all other observer names.

Field: DATE

Description: The date the bird was observed (mm/dd/yyyy).

Field: QUANTITY

Description: The number of birds detected of the indicated species.

Field: NORTHING

Description: UTM northing (NAD83) of the detection.

Field: EASTING

Description: UTM easting (NAD83) of the detection.

Field: DETAILS

Description: Details regarding encounter and identification of species.

Table B1. Habitat codes used in the databases.

Habitat	Code
Conifer Deciduous Mix	CODM
Douglas-fir	DOFI
Dune Grass	DUGR
Meadow	MEAD
Palustrine Wetland	PAWE
Pasture	PAST
Red Alder	REAL
Riverine Wetland	RIWE
Shore Pine	SHPI
Shrub	SHRU
Water	WATE
Western Hemlock	WEHE
Willow/Shrub Wetland	WSWE

Table B2. Bird species codes¹ used in the databases.

Common Name	Code	Common Name	Code
Double-crested Cormorant	DCCO	Winter Wren	WIWR
Great Blue Heron	GBHE	Marsh Wren	MAWR
Turkey Vulture	TUVU	Golden-crowned Kinglet	GCKI
Canada Goose	CAGO	Swainson's Thrush	SWTH
Mallard	MALL	American Robin	AMRO
Osprey	OSPR	European Starling	EUST
Bald Eagle	BAEA	Cedar Waxwing	CEDW
Northern Harrier	NOHA	Orange-crowned Warbler	OCWA
Killdeer	KILL	Yellow Warbler	YWAR
Spotted Sandpiper	SPSA	Yellow-rumped Warbler	YRWA
Western Gull	WEGU	Black-throated Gray Warbler	BTYW
Caspian Tern	CATE	Townsend's Warbler	TOWA
Band-tailed Pigeon	BTPI	Townsend's x Hermit Warbler Hybrid	THWH
Mourning Dove	MODO	Hermit Warbler	HEWA
Rufous Hummingbird	RUHU	Common Yellowthroat	COYE
Hairy Woodpecker	HAWO	Wilson's Warbler	WIWA
Pileated Woodpecker	PIWO	Western Tanager	WETA
Willow Flycatcher	WIFL	Spotted Towhee	SPTO
Pacific-slope Flycatcher	PSFL	Savannah Sparrow	SAVS
Hutton's Vireo	HUVI	Song Sparrow	SOSP
Warbling Vireo	WAVI	White-crowned Sparrow	WCSP
Steller's Jay	STJA	Dark-eyed Junco	DEJU
American Crow	AMCR	Black-headed Grosbeak	BHGR
Common Raven	CORA	Red-winged Blackbird	RWBL
Violet-green Swallow	VGSW	Brewer's Blackbird	BRBL
Cliff Swallow	CLSW	Brown-headed Cowbird	BHCO
Barn Swallow	BARS	Purple Finch	PUFI
Black-capped Chickadee	BCCH	Red Crossbill	RECR
Chestnut-backed Chickadee	CBCH	Pine Siskin	PISI
Red-breasted Nuthatch	RBNU	American Goldfinch	AMGO
Brown Creeper	BRCR		

¹ Codes follow Pyle and DeSante (2003).

Table B3. Field observers' names and initials.

Name	Initials
Amy Brown	AB
Heidi Pedersen	HP
Katie Stassen	KS
Mandy Holmgren	MH

Appendix C: Data Forms

page ____ of ____

Starting Northing:

--	--	--	--	--	--	--

Starting Easting:

--	--	--	--	--	--	--

Starting Direction: _____ Offset (Y, N): _____

Protocol (normal, restrict. hab, trail, mixed—on & offtrail, deliberate): _____

[illegible][illegible]

²Interval: 3=first detected during first three minutes of point count; 2=first detected during last two minutes of point count.

Fort Clatsop Vegetation Data

Datum = NAD 83

Point: FC_____ Northing: _____ Easting: _____ GPS error: _____ (m)

Date: ____/____/2004 Veg Obs: _____ Bird Obs: _____ Moisture: (1-3): _____ Run H₂O (1-5): _____

Std. H₂O(sq-m.):_____ Hab: _____ Hab2: _____ Other Habs W/in 100m: _____, _____

Notes:_____

Point: FC_____ Northing: _____ Easting: _____ GPS error: _____ (m)

Date: ____/____/2004 Veg Obs: _____ Bird Obs: _____ Moisture: (1-3): _____ Run H₂O (1-5): _____

Std. H₂O(sq-m.):_____ Hab: _____ Hab2: _____ Other Habs W/in 100m: _____, _____

Notes:_____

Point: FC_____ Northing: _____ Easting: _____ GPS error: _____ (m)

Date: ____/____/2004 Veg Obs: _____ Bird Obs: _____ Moisture: (1-3): _____ Run H₂O (1-5): _____

Std. H₂O(sq-m.):_____ Hab: _____ Hab2: _____ Other Habs W/in 100m: _____, _____

Notes:_____

Point: FC_____ Northing: _____ Easting: _____ GPS error: _____ (m)

Date: ____/____/2004 Veg Obs: _____ Bird Obs: _____ Moisture: (1-3): _____ Run H₂O (1-5): _____

Std. H₂O(sq-m.):_____ Hab: _____ Hab2: _____ Other Habs W/in 100m: _____, _____

Notes:_____

Point: FC_____ Northing: _____ Easting: _____ GPS error: _____ (m)

Date: ____/____/2004 Veg Obs: _____ Bird Obs: _____ Moisture: (1-3): _____ Run H₂O (1-5): _____

Std. H₂O(sq-m.):_____ Hab: _____ Hab2: _____ Other Habs W/in 100m: _____, _____

Notes:_____

Hab: CODM = Conifer Deciduous Mix, DFWH = Douglas-fir/Western Hemlock, DOFI = Douglas Fir, Mead = Meadow, REAL = Red Alder, SHRU = Shrub, WEHE = Western Hemlock, WERC = Western Redcedar, WSWE = Willow Shrub Wetlands, PAWE = Palustrine Wetlands, ESWE = Estuarine Wetlands, RIWE = Riverine Wetlands

Moisture: 1=dry, 2=wet, 3=puddles/standing water **Run H₂O:** 1=none, 2=trickle, 3=small stream, 4=large stream, 5=river

Fort Clatsop National Memorial Point Count Densiometer Readings

Transect: _____ Date: _____ Observer: _____

Note: Please record the number of OPEN quarter-squares!!!

Point 1			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 2			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 3			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 4			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 5			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 6			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 7			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 8			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 9			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 10			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 11			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 12			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 13			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Point 14			
North: _____/96	East: _____/96	South: _____/96	West: _____/96

Fort Clatsop National Memorial Inventory Rare Bird Report Form

Obs.:	Species:	Date: / /2004	Qty:	Northing: _ _ _ _ _	Easting: _ _ _ _ _	Time:
Transect and point, if detected during a point count:						
Description (include diagnostic plumage and vocalization details used to identify the individual, sex, #'s, and any nest sightings or behavior indicative of nesting):						

Obs.:	Species:	Date: / /2004	Qty:	Northing: _ _ _ _ _	Easting: _ _ _ _ _	Time:
Transect and point, if detected during a point count:						
Description (include diagnostic plumage and vocalization details used to identify the individual, sex, #'s, and any nest or behavior indicative of nesting):						

Obs.:	Species:	Date: / /2004	Qty:	Northing: _ _ _ _ _	Easting: _ _ _ _ _	Time:
Transect and point, if detected during a point count:						
Description (include diagnostic plumage and vocalization details used to identify the individual, sex, #'s, and any nest sightings or behavior indicative of nesting):						

Hitlist:
 COLO
 All Grebe spp.
 All Waterfowl
 Scoter spp.
 Merganser spp.
 MAMU
 TUVU
 OSPR
 BAEA
 NOHA
 SSHA, COHA
 NOGO, RTHA
 GOEA
 MAKE, MERL
 PEFA
 RNPH
 SPGR
 WTPT
 All Quail Spp.
 VIRA
 Shorebird spp.
 All Gull spp.
 MAMU
 BTPI, MODU
 All Owl spp.
 CONI, ANHU
 All Swift Spp.
 BEKI
 LEWO, WISA
 RNSA, TTWO
 BBWO
 WIFL, DUFL
 WEWP, WEKI
 WESJ, CLNU
 HOLA
 All Swallows
 REVI
 WBNU
 CANW, ROWR
 HOWR, MAWR
 RCKI
 WEBL, MOBL
 TOSO, NOMO
 AMPI, EUST
 CEDW, GRCA
 NAWA, HEWA
 AMRE, COYE
 VESP, SAVS
 FOSP, LISP
 GCSP, LAZB
 WEME, YHBL
 BUOR, RWBL
 BRBL, BHCO
 GCRF, PIGR
 PUF1, CAFI
 WWCR, AMGO

 Or anything you
 even suspect
 may be unusual
 or outside its

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Date: ____/____/2004

Observer.: ____

Point Numbers Completed: ____

Off-grid Points

Point number: ____ Distance and Direction from Assigned Grid Point: ____

Explanation: ____

Point number: ____ Distance and Direction from Assigned Grid Point: ____

Explanation: ____

Point number: ____ Distance and Direction from Assigned Grid Point: ____

Explanation: ____

Point number: ____ Distance and Direction from Assigned Grid Point: ____

Explanation: ____

Point number: ____ Distance and Direction from Assigned Grid Point: ____

Explanation: ____

Transect notes:

Weather: ____

Vegetation phenology and natural history observations (please record unusual bird sightings on the Rare Bird Report Form): ____

Other: ____
